

**Physics 1403-A2  
Stars and Galaxies  
Blinn College – Bryan Campus  
Fall, 2009**

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**Office Hours:** Monday and Wednesday: 2:45 pm – 4:00 pm  
Tuesday and Thursday: 12:00 pm – 1:00 pm  
(other times by appointment)

**Course Information****Course Web site:** [www.blinn.edu/brazos/natscience/jfreeman](http://www.blinn.edu/brazos/natscience/jfreeman)**Classroom Locations and Meeting Times:**

Lecture	Lab
Room G213 MW 5:40 pm – 6:55 pm	Room G233 MW 7:05 pm – 8:20 pm

**Course Description:**

This course is a survey of astronomy without solar system topics. Topics include the techniques and methods of modern astronomy, the stars, our galaxy and other galaxies, the large-scale structure of the Universe and cosmology (the origin and evolution of the Universe). Also included are aspects and applications of spectroscopy, atomic structure, optics, mechanics, gravitation and relativity. The class is mostly descriptive in nature, with a minimum of mathematics. There will be three class hours and three lab hours per week. There will also be a number of outside observing activities (weather permitting). Most observing activities will occur outside of the regular class time and, therefore, are not required.

**Prerequisites:**

None.

**Core Curriculum Course:**

This is a course in the 42-hour Core Curriculum of Blinn College. Students will develop proficiency in appropriate intellectual competencies, exemplary educational objectives and general perspectives. The URL of the Blinn College core curriculum web site is [www.blinn.edu/corecurriculum/42hourcore.htm](http://www.blinn.edu/corecurriculum/42hourcore.htm).

**Course Objectives:**

After completing the course a student should be able to recognize fundamental physics principles as applied to the field of astronomy, appreciate the changes in man's understanding of his place in the universe, know the basic structure of our solar system, our star, our galaxy and the universe. Students are expected to know the prevailing theories on the lifetimes of stars and the time evolution of the universe. Students are expected to know the instrumentation commonly used in astronomy and the use of the literature available.

**Student Learning Outcomes:**

Explain the concept of the celestial sphere; angular measurement conventions; the motions of the Earth, the Sun, the Moon and the stars; lunar and solar eclipses; and the simple geometric determination of distances and sizes of faraway objects.

Relate the early Earth-centered and modern Sun-centered solar system models. Describe history of astronomy from Renaissance science to the major contributions of Galileo, Kepler, and Newton. Be able

to state the laws of Kepler and Newton and understand how they are useful in describing motion and measuring masses of astronomical bodies.

Have a basic understanding of electromagnetic (e-m) radiation, its sources and how it transfers energy and information through interstellar space. Describe the major regions of the e-m spectrum; continuous, emission, and absorption spectra; and the kinds of information that can be obtained by analyzing the spectra of astronomical objects.

Discuss basic optical telescope designs, the need for very large telescopes, atmospheric effects and modern technological improvements, the advantages and disadvantages of using radio and other non-visible radiation for astronomical observations.

Discuss the overall properties of the Sun, how energy is produced and travels from the core out into space. Name and describe the inner and outer regions, how the composition and temperatures are determined, and the various types of solar activity.

Discuss measurements of stellar distances and motions of stars. Discuss classification of stars by luminosity, brightness, colors, surface temperatures, spectral characteristics, mass and size. Describe an H-R diagram.

Discuss composition and properties of the interstellar medium, the nature of emission nebulae and dark interstellar clouds, and the techniques to determine these characteristics.

Summarize and discuss the stages of star formation, how it depends on mass, and the importance of star clusters. Explain and outline the events of stellar evolution off the main sequence. Contrast evolutionary histories of high-mass and low-mass stars.

Describe novae and supernovae events, how each are produced, the end products, and the origin of heavy elements. Describe the origin and properties of neutron stars, pulsars, and other strange stellar objects. Discuss the phenomena of black holes, their formation and effects on matter and radiation, and methods of detecting their presence.

Describe the Milky Way Galaxy: the overall structure, the different regions, importance of variable stars, explanations of spiral arms, size and mass, dark matter, and phenomena at the center.

Discuss normal and active galaxies, quasars, the large-scale distribution in the Universe, formation and evolution theories, distance-measurement techniques, and Hubble's Law.

State the cosmological principle and discuss the models of the origin and evolution of the Universe. Discuss the uncertainties and the observational evidence.

**Textbooks and other materials:**

- **Required Textbook:** *Astronomy Today: Stars and Galaxies*. Chaisson, Eric and Steve McMillan. Pearson Addison-Wesley. 6<sup>th</sup> edition.
- **Required Laboratory Manual:** Reprints are available in the Copy Center.
- **Required Homework System:** Students *must* purchase an access key to [Mastering Astronomy](#), the textbook publisher's online homework system. This key is bundled with the textbook at the Blinn bookstore. Alternatively, you can purchase the access key online at [www.masteringastronomy.com](http://www.masteringastronomy.com); be sure to select the Chaisson text above to pair with *Mastering Astronomy*. The *Mastering Astronomy* Course ID for section A2 is **BLINN1403A2F09**. **\*\*\*Make sure to enter it exactly as it is given here.\*\*\***
- **A scientific calculator**

## **Blinn College Policies**

### **ADA Statement:**

Students with physical or learning disabilities must contact the [Office of Disability Services](#) (Room 157, Science Bldg.) to receive accommodation on exams and assignments. The Office of Disability Services will provide the student with an accommodation letter specifying the accommodations that are to be provided to the student. The student must present this letter to the instructor in order to receive accommodation. Accommodation is not retroactive.

### **Attendance**

The College District believes that class attendance is essential for student success; therefore, students are required to promptly and regularly attend all their classes. Each class meeting builds the foundation for subsequent class meetings. Without full participation and regular class attendance, students shall find themselves at a severe disadvantage for achieving success in college. Class participation shall constitute at least ten percent of the final course grade. It is the responsibility of each faculty member, in consultation with the division chair, to determine how participation is achieved in his or her class. Faculty will require students to attend class regularly and will keep a record of attendance from the first day of class or the first day the student's name appears on the roster through final examinations. If a student accumulates one week's worth of unexcused absences during the semester, he or she will be sent an e-mail by the College requiring the student to contact his or her instructor and schedule a conference immediately to discuss his or her attendance issues. **Should the student accumulate two weeks' worth of unexcused absences he or she will be administratively withdrawn from class.**

There are four forms of excused absence officially designated by Blinn College: (1) observance of religious holy days: The student should notify his or her instructor not later than the 15<sup>th</sup> day of the semester concerning the specific date(s) that the student will be absent for any religious holy day(s); (2) representing Blinn College at an official institutional function (3) official involvement in a high school activity for "dual credit" students and (4) required military service.

**Note: Missing lecture or lab counts as one absence. If a student misses both lecture and lab periods for a given day, it counts as only one absence.**

### **Student E-mails**

Students are assigned an e-mail address that must be checked regularly for official Blinn communications and course information. The address is of the form:

*Firstname.LastnameLast2digitsBlinnID@buc.blinn.edu*. Information about accessing this account can be found at: [www.blinn.edu/acadtech/studentemail/](http://www.blinn.edu/acadtech/studentemail/).

- **Note:** All official course email between the instructor and students will be via [eCampus](#) email.

### **Dropping**

If a student chooses to drop the course, it is that student's responsibility to complete a drop order at the Office of Enrollment Services. Failure to do so could result in a grade of F in the course.

### **Classroom Civility**

Members of the Blinn College community, which includes faculty, staff and students, are expected to act honestly and responsibly in all aspects of campus life. Blinn College holds all members accountable for their actions and words. Therefore, all members should commit themselves to behave in a manner that recognizes personal respect and demonstrates concern for the personal dignity, rights, and freedoms of every member of the College community, including respect for College property and physical and intellectual property of others.

If a student is asked to leave the classroom because of uncivil behavior, the student may not return to that class until he or she arranges a conference with the instructor. It is the student's responsibility to arrange for this conference.

**Mobile Phones**

All mobile phones must be turned off at all times while in the classroom or lab.

**Scholastic Dishonesty**

Blinn College does not tolerate cheating, plagiarism, or other acts of dishonesty. Definitions of these acts and procedures for dealing with them are described in "Scholastic Dishonesty" in the [Blinn College Student Handbook](#), copies of which are available at the information desk in the Administration Building.

**Blinn College grading system\***

A = 90 –100	Superior
B = 80 – 89	Above Average
C = 70 – 79	Average
D = 60 – 69	Passing
F = < 60	Failing

\*from Board Policy Manual EGA(LOCAL), issued 05/24/2004

**Class Details****eCampus**

The eCampus system will be our primary means of communication outside of class. Each student will be enrolled in the appropriate eCampus course. Access the course at [ecampus.blinn.edu](http://ecampus.blinn.edu). The following items will be available online:

- Important announcements
  - Students should check daily for new announcements
- Email
  - **Note:** All official course email between the instructor and students will be via [eCampus](#) email.
- Copies of Power Point lecture slides
- Copies of all handouts
- Grades
- Links to external resource material
  - A link to a web site that provides study aids and practice exams
  - Other web sites of interest to astronomers and astronomy students
- Discussion forums/Blogs
- A detailed schedule

**Tentative Exam Schedule**

Exam	Material Covered	Date (tentative)
1	Chapters 1-5	Wednesday September 23 <sup>rd</sup>
2	Chapters 16-20	Monday October 26 <sup>th</sup>
3	Chapters 21-25	Monday November 23 <sup>rd</sup>
Final Exam	Comprehensive	Friday December 11 <sup>th</sup> : 5:30pm – 7:30pm

**Course Schedule**

A detailed course schedule is available on [eCampus](#).

**Criteria for Grading**

Grades will be based on three exams and a comprehensive final exam, labs, homework, and an optional service project.

- **Exams:** All exams will be closed-book and closed-note exams. Test items requiring computation must have valid supporting work shown for credit.
- **Labs:** A handout containing specific Lab policies and procedures is available on [eCampus](#). Once on the eCampus course site, select **Lessons->Physics 1403 Handouts->Lab Policies and Protocol**.
  - Lab reports are due at the end of the lab period unless I notify you otherwise.
  - Labs are graded as A, A-, B, B-, C, etc., with A=95%, A- = 90%, B=85%, B- = 80%, C=75%, etc. Note that the average of an A and a B is 90%, which is an A-.
  - Videos shown count as a lab. You are required to submit a single-sided notebook-paper sheet of bulletized points summarizing the video. Your grade will be based on your level of effort.
- **Homework:** Homework is graded automatically by the *Mastering Astronomy* system.
  - Each assignment will have a due date. You will get no credit if you submit an assignment past the due date. Due dates will typically be midnight on the day before I give an exam covering the material.
  - You have a maximum of 6 attempts to answer any problem.
  - There will be some multiple-choice questions. Don't just guess at the answer until you find the correct one. If you guess wrong, you will be penalized according to the number of possible answers. For example, if there are four possible answers and you guess wrong once, the maximum possible score on that problem will drop to 75%.
  - You can ask for a hint. If you ask for a hint, you will be penalized 1% for each hint you receive.
  - If you answer a question incorrectly, you receive a deduction of 3% per incorrect answer.
- **Service Learning Project:** The Service Learning project will require an outreach activity such as assisting in a major public viewing session. Additional information is available on [eCampus](#). Once on the eCampus course site, select **Lessons->Physics 1403 Handouts->Service Learning**. A Service Learning project is optional. The calculation of your grade depends upon whether you choose to participate in a project.
- **Grading summary:**
  - Plan A
    - Exams 1-3 (40%), Final (20%), Homework (12.5%), Labs (12.5%), Service Learning Project (15%)
  - Plan B
    - Exams 1-3 (55%), Final (20%), Homework (12.5%) Labs (12.5%)

### Observing Sessions

We will attempt to schedule a number of observing sessions outside of the regular class time. These sessions will depend, of course, on the weather. There will be both daytime (solar) viewing, and evening sessions. Since these sessions will occur outside normal class time, they are optional; however, attendance at a viewing session is the only way to make up a missed video lab. Since the sessions depend on the weather, you cannot be guaranteed an opportunity to make up a video lab.

**Classroom Policies**

Specific classroom policies appear in the document **Course Policies** on the eCampus course site. Select **Lessons->Physics 1403 Handouts->Course Policies**.